

[This question paper contains 16 printed pages.]

Your Roll No.....7

Sr. No. of Question Paper : 8591

J

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Name of the Paper : Programming Fundamentals  
using C++

Name of the Course : B.Sc. (H) Computer Science

Semester : I

Duration : 3 Hours

Maximum Marks : 75

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question 1 is compulsory in Section A.
3. Attempt any **four** questions from Section B.
4. Parts of a question should be attempted together.

**SECTION A**

1. (a) Consider the following declaration statements :

```
float f;  
int *b = &f;
```

P.T.O.

Identify the error and write the code to correct it. (2)

(b) Assuming that the required header files have been included where required, what will be the output produced on execution of the following code segments :

```
(i) double z1;
    double y = 56.7;
    int x = 34;
    if(x)
    {
        z1 = y++;
        cout<<z1<<"\n"<<y;
    }
    else
    {
        z1 = y+x/2;
        cout<<z1<<y;
    }
```

 (2)

```
(ii) int x = 4, y = 3;
    for(int i = 1; i<=x; i++)
    {
        for(int j = y; j>=1; j--)
            cout<<(i*j);
        cout<<"\n";
    }
```

 (4)

```
(iii) int v;  
      int k = 10;  
      v = (150%k ? k+5: ++k);  
      cout<<"v=" <<v <<"k=" <<k;  
                                                    (2)
```

```
(iv) int i;  
      int b[]={101,120,130,-340,-112,  
               -114};  
      for (i = 0; b[i]>0; i++)  
      ;  
      cout <<i;                                                    (2)
```

```
(v) int i = 890;  
      double x = 4.678;  
      cout<<setw(5)<<i<<"\n";  
      cout<<fixed;  
      cout<<setprecision(6);  
      cout<<"x="<<x<<"\n";  
      cout<<oct<<"Octal="<<i;                                     (4)
```

```
(vi) string s("The basic program  
      of C plus plus");  
      int j;  
      int k=0;  
      int count=0;  
      j = s.find('u',k);
```

P.T.O.

```
while(j!=-1)
{
    count++;
    j = s.find('u',j+1);
}
```

```
cout<<count;
```

(vii) class Base

```
{
    public:
    Base()
    {
        cout<<"Inside Base\n";
    };
};
```

```
class Derived1: public Base
{
    public:
    Derived1()
    {
        cout<<"Inside Derived1\n"
    }
};
```

```
class Derived2 : public Derived1
{
    public:
    Derived2 ()
    {
        cout<<"Inside Derived 2\n";
    }
};
void main()
{
    Base o1;
    Derived1 o2;
    Derived2 o3;
}
```

(3)

(c) Assuming that the required header files have been included where required, Find out the error in the following code fragments

```
(i) void f(int *p)
{
    int a;
    *p = a;
    *a = *a+1;
    return a;
}
```

(3)

P.T.O.

```
(ii) void try(int a,int b)
{
    if(a<0) throws "Negat
number";
}
```

(d) Write a function to remove duplicate element from one dimensional integer array A of size n.

(e) Rewrite the following while statement as equivalent for statement :

```
int x = 0;
while(x<10)
{
    cout<<x<<endl;
    x++;
}
```

## SECTION B

2. (a) Write a program to count the number of vowels in a string entered as command line argument.

- (b) Consider four integer variables that has been initialized as :  $y = 5$ ,  $z = 0$  and  $t = -4$ . What is the value of each of the following expressions on evaluation (consider each part independent of other)?

(i)  $t \ || \ z < (y+5) \ \&\& \ y$

(ii)  $3 * y / 4 \% 5 \&\& y$

(iii)  $! (4 + 5 * y \geq z - 4) \&\& (z - 2)$  (3)

- (c) Write a C++ function that takes an array of characters to convert all lowercase characters to uppercase (without using *built-in* functions) and return type is void. (4)

3. (a) What will be the output produced on execution of the following code segment :

```
#include<iostream>
using namespace std;
void main()
{
    int i;
    int j = 11;
    int m = 6;
    for(int i = 1; i<=m; i++)
```

P.T.O.

```

    {
        for(int t=1; t<=j; t++)
            cout<<t;
        j = j-2;
        cout<<"\n";
    }
}

```

- (b) Write a function `UpperTriangular()` accept a matrix `A` of order  $n \times n$  as an argument as well as its order. The function should convert matrix `A` to uppertriangular matrix assigning 0 to all elements below principal diagonal(diagonal left to right from top).

4. (a) Consider the following class :

```

class Rationalnumber
{
    int p,q;
    ...
};

```

The above class is designed to define a rational number with numerator `p` and denominator `q`. In the above class write the definitions of the following member functions :

- (i) Parameterized constructor
- (ii) Overload + operator to add two rational numbers
- (iii) Display function

Write the suitable statements to create three rational numbers r1, r2 & r3 having 5/7, 6/7 and 8/7. Use operator overloading to store the sum of two objects in third object r3. Use the display function to print the content of object r1, r2 and r3.

(6)

- (b) Write a program that reads a file and print the number of lines in it.

(4)

5. (a) What will be the output produced on execution of the following code segment :

```
#include<iostream>
using namespace std;
void main()
{
    int arr[]={12,34,56,89};
    int temp;
    int size = 4;
    for(int i=0,j=size-1;i<j; i++,j--)
    {
```

P.T.O.

```
        temp = arr[i];
        arr[i] = arr[j];
        arr[j] = temp;
    }
    for(int i = 0;i<size;i++)
        cout<<arr[i]<<"\n";
}
```

(b) Consider a following class :

```
class X
{
    int i1;
public:
    X()
    {
        i1 = 15;
    }
    virtual void display()
    {
        cout<<"i1="<<i1<<endl;
    }
};

class Y :public X
{
    int j1;
```

```
public:
Y()
{
    j1 = 10;
}
...
};
class Z:public Y
{
    int k1;
public:
    Z()
    {
        k1 = 20;
    }
    ...
};
```

Replace ellipses ... by appropriate C++ code to override method `display()` in class Y and Z. Use Runtime polymorphism to display the content of objects of class X, Y and Z. (6)

6. (a) Consider the following declarations:

```
string s1 = "Hello World";
string s2 = "Program in C++";
```

P.T.O.

Write code fragments for the following :

(i) To compare the first four characters of s1 with the last two characters of s2

(ii) To extract the last six characters of s

(b) Write the output on execution of the following code :

```
#include<iostream>
using namespace std;
class myexception
{
    string str;
public:
    myexception(string p)
    {
        str=p;
    }
    void display()
    {
        cout<<str;
    }
}
```

```
};  
  
void main()  
{  
    int n,m;  
  
    try  
    {  
        n = 5;  
        m = -6;  
        if (n<0)  
            throw myexception("Negative  
            number");  
        cout<<n<<endl;  
        if (m<0)  
            throw myexception("Negative  
            number");  
        cout<<m;  
    }  
    catch(myexception ol)  
    {  
        ol.display();  
    }  
}
```

(5)

P.T.O.

7. (a) Identify an error in the following code and give reasons for the same:

```
(i) #include <iostream>
using namespace std;
class US1
{
    int p;
    protected:
    int q;
    public :
    int r;
};
class US2: public US1
{
    protected:
    float s,u;
};
void main()
{
    US1 o1;
    US2 o2;
    cout<<o1.p;
```

```
cout<<o1.q;  
cout<<o1.r;  
cout<<o2.p;  
cout<<o2.q;  
cout<<o2.r;  
cout<<o2.s;  
cout<<o2.u;
```

```
}
```

(3)

(ii) do

{

int ctr=0;

cout&lt;&lt;ctr;

ctr++;

}while(ctr!=10);

(2)

(iii) void f( int n )

{

if (n==0) return 1;

}

(1)

(b) Write C++ declarations for the following :

(2+2)

- (i) A function that accepts an array of integers, a character variable and returns a pointer to an integer.
- (ii) print integer x with field width as 10 and fill character as '\*'.

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